

Spencer R. Klein

50R5008 Lawrence Berkeley National Laboratory
1 Cyclotron Road
Berkeley, CA, 94720, USA

SRKLEIN@LBL.GOV
w: (510) 486-5470
h: (510) 559-3277

Current Research:

My research interests focus on neutrinos and on ultra-peripheral collisions (photonuclear interactions) of relativistic ions.

My group is searching for high-energy astrophysical neutrinos, particularly electron and tau neutrinos, using the 1 km³ IceCube neutrino observatory. We are also interested in high p_T particle (specifically muons) production in cosmic-ray air showers and, more generally, in phenomenology of high-energy nuclear astrophysics, and in signatures for 'new physics,' such as dark matter. The group is also involved with prototypes for the proposed ARIANNA detector; this is a 100 km³ neutrino detector on the Ross Ice Shelf, sensitive to neutrinos with energies above 10¹⁷ eV. In addition to the astrophysics, I am also interested in how high energy particles interact in matter.

I also study ultra-peripheral collisions (UPCs) of relativistic nuclei, such as two-photon and photonuclear interactions. UPCs probe a wide range of physics topics, from the neutron radii of heavy nuclei to strong field electrodynamics to meson spectroscopy to entangled quantum states.

Experience:

Senior Scientist, 2008-present, and **Staff Physicist**, 1994-2008, Lawrence Berkeley Laboratory.

Deputy Director, Nuclear Science Division, Oct. 2010 - Jan. 2013. Participated in the management of a division consisting of 135 employees and about 200 guests performing research in all areas of nuclear science. Responsible for strategic planning, safety, communications and other operational areas.

Group Leader for Neutrino Astronomy. Lead LBNL group working on the 250 member international IceCube 1 km³ neutrino observatory, 2007-present. Co-lead Diffuse and Atmospheric Neutrino Physics Working Group, 2007-present. Led "Cascades" Detector Channel Working Group 2006-2010. Chair, IceCube Publications committee, 2007-2010. Developed simulation code for IceCube electronics. Developing new analysis algorithms to reconstruct electron neutrinos and to study high

p_T muons in cosmic-ray air showers and search for photon-initiated showers. Phenomenological studies of electromagnetic interactions.

Deployed a prototype station for ARIANNA 100 km³ neutrino detector on the Ross Ice Shelf in Antarctica and studied the site characteristics.

Co-convenor, STAR ultra-peripheral collisions (UPCs) working group, 1997-2000 & 2002-2007. Led 5 institution, trinational group studying coherent nuclear interactions at RHIC. Perform theoretical and experimental studies of coherent vector meson production, interferometry, and e^+e^- production.

Lead Physicist for STAR (Solenoidal Tracker at RHIC) TPC electronics, 1994-2000. Oversaw development, production, installation and commissioning of \$4 million, 138,000 channel, low noise preamplifier/shaper and waveform digitizer (switched capacitor array/ADC) system. Applied design to STAR forward TPCs.

Research Physicist, University of California, Berkeley, 2006-present. Principal Investigator for National Science Foundation grant for IceCube analysis. Supervise graduate students and postdocs.

Lecturer, University of California, Berkeley, Spring, 1996. Taught Physics 24 (freshman seminar), on “Nuclear Physics: Science and Applications.”

Postgraduate Researcher, University of California, Santa Cruz, 1991 - 1994.

Spokesperson for SLAC-E146, an 11 member UCSC-SLAC-Livermore-American Univ. collaboration which performed a fixed target experiment to study interference between multiple scattering and bremsstrahlung (the LPM effect). Led collaboration from conception and proposal development through design and construction, data taking and analysis. Developed a novel ‘parasitic’ beam allowing experiments to avoid the costs of dedicated accelerator running.

Designed electronics for MILAGRO air shower detector. Developed a method to make air shower detectors sensitive to gamma ray burst photons with ~ 10 GeV by counting single particle hits.

Research Assistant Professor and Research Associate, Boston University, 1988 - 1991.

Searched for magnetic monopoles and other new particles and studied astrophysical phenomena in MACRO experiment. Designed, built, and characterized a 200 MHz waveform digitizer with ‘on the fly’ zero suppression. Oversaw characterization of 900 8” photomultiplier tubes by undergraduate technicians. Created data acquisition and trigger scheme for the TEXAS SSC detector proposal.

Visiting Researcher, Programa de Anthropologia para el Ecuador, Salango, Ecuador, September to November, 1988.

Studied pre-Colombian architecture using archaeological remains. Excavated at Rio Chico and Salango, and worked on an archaeological survey of the surrounding area.

Research Assistant, Stanford Linear Accelerator Center. 1980 & 1982-1988.

Studied baryon production in 29 GeV e^+e^- collisions. Programming and maintenance of Mark II secondary trigger logic. Developed ultra-low noise LN₂ cooled preamplifier and computer data acquisition system for a fractional charge search.

Senior Teaching Assistant and **Teaching Assistant**, Stanford University, September, 1983 to June, 1984 and April to June, 1985.

Designed and Taught “Modern Physics through Science Fiction” (Physics 13). Head Teaching Assistant for Modern Physics for Engineers. Directed staff of 6 TA’s. Teaching Assistant for introductory physics for biologists.

Education:

PhD in Physics, Stanford University, 9/82-6/88. Specialization: Experimental particle physics. Thesis: Baryon production in e^+e^- Annihilation at an E_{cm} of 29 GeV. Advisor: Professor Tom Himel. Graduate minor in anthropology, concentrating in archaeology.

BA in Physics, University of California, San Diego, 9/79 - 6/81. Minor in history.

Awards and Honors:

Named Fellow of the American Physical Society, Nov. 2009.

Professional Activities:

Service to the Physics Community

Organizer, Workshop on “Probing QCD in Photon-Nucleus Interactions at RHIC and the LHC: the path to EIC, Institute for Nuclear Theory, Univ. Washington, Feb. 13-17, 2017.

Scientific Advisory Committee and Advisory Committee, “Electron-Ion Collider User Group Meeting, Berkeley, CA, January 6-9, 2016.

Session organizer for atmospheric neutrinos, “Very Large Volume Neutrino Telescopes,” Rome, Italy, Sept. 14-16, 2015.

Organizing Committee, Workshop on “Photon-induced Collisions at the LHC, CERN, Geneva, Switzerland, June 2-4, 2014.

Dept. of Energy review panel for high-energy nuclear physics, Germantown, MD, August 12-13, 2014.

American Physical Society Topical Group on Hadron Physics Program Committee, 2011-13.

Organizing Committee, Workshop on “Photoproduction at Collider Energies: from RHIC and HERA to the LHC,” Jan. 2007, European Center for Nuclear Physics, Trento, Italy.

Organizer for 2007 Town Meeting on “Neutrinos, Neutrons and Fundamental Symmetries.” Organized parallel session on “Dark Matter in Nuclear Physics,” and led writing of white paper on that topic.

Nominating Committee, American Physical Society Topical Group on Hadron Physics, for 2006 election.

International Organizing Committee, “From Colliders to Cosmic Rays,” Prague, Czech Republic, Sept., 2005.

Local Organizing Committee, Quark Matter 2004.

Organizing Committee, workshop on “Diffraction and Glueball Searches at RHIC,” March, 2002, Brookhaven National Laboratory.

Consultant to Particle Data Group on bremsstrahlung and pair creation, 2000-present.

Local Organizing Committee, Fall 1999 Meeting of the Division of Nuclear Physics, American Physical Society. Co-organizer of a 4 day conference with 750 participants. Co-organized a workshop on “Structure Functions of Heavy Nuclei at RHIC.”

Program Committee, Division of Nuclear Physics, American Physical Society, 1997-1999.

Reviewer for Department of Energy grants and SBIR proposals, National Science Foundation grants and MRI proposals, Canadian National Science and Engineering Council proposals.

U.S. Civilian Research and Development Foundation physics review panel, 2004. Evaluated grant proposals from the former Soviet Union countries.

Referee for numerous journals, including Physical Review Letters, Physical Review

C and D, Physics Letters B, Astroparticle Physics, Nuclear Instruments & Methods, J. Phys. G. and IEEE Trans. Nucl. Sci.

Service to LBNL and the University of California

Review committee for an ARRA funded 8-megapixel X-ray camera, Sept. 14, 2010.

Founder and Editor, Nuclear Science Division Newsletter, 2010-2013.

Laboratory Staff Advisory Committee, 2010-2013.

LBNL Laboratory correspondent for the CERN Courier, 2006-present.

Nuclear Science Division Staff committee, 2009-present.

Principal Investigator, for funded IceCube ERCAP proposal/allocation from NERSC, 2004-2008.

LBNL General Sciences Workplace Committee, 2003-2006. Developed ‘Living List’ for Nuclear Science Division, worked on workplace diversity and postdoc career planning.

Chair, DAQ hardware subcommittee, LBNL IceCube vetting review, Dec. 2003.

Chair, detector and electronics subcommittee, LBNL GRETINA vetting review, Nov. 2003.

Nuclear Science Division Equipment Committee, 1996-1998.

Lawrence Berkeley National Laboratory, Employee Outstanding Performance Award, 1995-6.

Public presentations and outreach activities

Presentation on neutrinos to high school students and teachers as part of “Quarknet,” LBNL, June 24, 2016.

“Searching for the hottest places in the universe from the coldest place on Earth,” TedX Intuit Talk, Mountain View Center for the Performing Arts, August 5, 2014.

“Searching for the Sources of Cosmic Rays,” Osher LifeLong Learning Institute public lecture, Freight & Salvage Coffeehouse, Berkeley, Feb. 5, 2014.

“Extreme Science” presentation for “Science in the Theater,” Berkeley Reportory Theater, February 27, 2012. Video is available at <http://www.youtube.com/watch?v=zuyaPaFbT3A>

“Science@Cal” lecture on “Neutrino Astronomy in Antarctica,” August 21, 2010.

Presentation on “Exploring Cosmic-rays with IceCube,” LBNL Take your daughters and sons to work day, April 23, 2009.

Visits to local elementary and middle schools to discuss phase changes, and science in Antarctica, under the auspices of LBNL CSEE, Community Resources for Science, and various personal contacts, 2006-present.

Biweekly columnist for the *Stanford Daily*, September, 1983 to January, 1984 and September, 1987 to January, 1988. General interest writing for various publications, including *Radio Electronics*, *Environmental Action*.

My photographs of IceCube, ARIANNA, Antarctica and other scientific trips have appeared in publications as diverse as *Fox News*, *NBC News* and *Science*.

Refereed Publications

Primary Authorships

These are papers to which I made a substantial contribution.

1. Invest in neutrino astronomy, Spencer Klein, *Nature* **533**, 462 (2016).
2. STARlight: A Monte Carlo simulation program for ultra-peripheral collisions of relativistic ions, S. R. Klein, J. Nystrand, J. Seger, Y. Gorbunov and J. Butterworth, arXiv:1607.03838.
3. Flavor Ratio of Astrophysical Neutrinos above 35 TeV in IceCube, M. G. Aartsen *et al.*, *Phys. Rev. Lett.* **114**, 171102 (2015). This paper was the subject of a Physics Synopsis, and was written up in *Nature* and *Physics World*.
4. Measurement of the Atmospheric ν_e Spectrum with IceCube, M. G. Aartsen *et al.*, *Phys. Rev.* **D91**, 122004 (2015).
5. Adventures in Antarctic Computing, or How I Learned to Stop Worrying and Love the Neutrino, L. Gerhardt, J. C. Diaz Velez and S. R. Klein, *IEEE Computer* **47N9**, 56 (2014).
6. Heavy Ion beam loss mechanisms at an electron ion collider, S. R. Klein, *Phys. Rev. ST Accel. Beams* **17**, 121002 (2014).
7. A new contribution to the conventional atmospheric neutrino flux, T. K. Gaisser and S. R. Klein, *Astropart. Phys.* **64**, 13 (2014).
8. Impact of Secondary Acceleration in Gamma-Ray Bursts, W. Winter, J. Becker Tjus and S. R. Klein, *Astron. & Astrophys.* **569**, A58 (2014).

9. Double Neutrino Production and Detection in Neutrino Detectors, D. van der Drift and S. R. Klein, *Phys. Rev.* **D88**, 033013 (2013).
10. Muon Acceleration in Cosmic-ray Sources, S. R. Klein, R. Mikkelsen, J. K. Becker Tjus, *Astrophysical Journal* **779**, 106 (2013).
11. Lateral Distribution of Muons in IceCube Cosmic Ray Events, R. Abbasi *et al.*, *Phys. Rev.* **D87**, 012005 (2013).
12. An improved method for measuring muon energy using the truncated mean of dE/dx , R. Abbasi *et al.*, *Nuclear Instrum. & Meth.* **A703**, 190 (2013).
13. ρ^0 Photoproduction in AuAu Collisions at $\sqrt{s_{NN}} = 62.4$ GeV with STAR, G. Agakishiev *et al.*, *Phys. Rev.* **C85**, 014910 (2012).
14. Proton-Nucleus Collisions at the LHC: Scientific Opportunities and Requirements, C. A. Salgado *et al.*, *J. Phys. G.* **39**, 015010 (2012).
15. High energy cosmic-ray interactions with particles from the Sun, Kristoffer Andersen and Spencer Klein, *Phys. Rev.* **D83**, 103519 (2011).
16. IceCube: An Instrument for Neutrino Astronomy, F. Halzen and S. R. Klein, *Rev. Sci. Instrum.* **81**, 081101 (2010). This was the cover story for the article, with an IceCube graphic on the cover.
17. Electron and Photon Interactions in the Regime of Strong LPM Suppression, L. Gerhardt and S. R. Klein, *Phys. Rev.* **D82**, 074017 (2010).
18. A prototype station for ARIANNA: a detector for cosmic neutrinos, L. Gerhardt *et al.*, *Nucl. Instrum. & Meth.* **A624**, 85 (2010).
19. Coherent ρ^0 photoproduction in bulk matter at high energies, E. Couderc and S. Klein, *Phys. Rev. Lett.* **103**, 062504 (2009). This paper was featured in “Physical Review Focus:” <http://focus.aps.org/story/v24/st6>. We also published a reply to a comment on this paper, in *Phys. Rev. Lett.* **103**, 259202 (2009).
20. Observation of Two-source Interference in the Photoproduction Reaction $AuAu \rightarrow AuAu\rho^0$, B. I. Abelev *et al.*, *Phys. Rev. Lett.* **102**, 112301 (2009). This was a PRL “Editors Suggestion.”
21. Two-Photon Interactions with Nuclear Breakup in Relativistic Heavy Ion Collisions, A. Baltz, Y. Gorbunov, S. Klein and J. Nystrand, *Phys. Rev.* **C80** 044902 (2009).
22. Supersymmetric and Kaluza-Klein Particles Multiple Scattering in the Earth, I. Albuquerque and S. Klein, *Phys. Rev.* **D80**, 015015 (2009).

23. The IceCube Data Acquisition System: Signal Capture, Digitization and Time-stamping, R. Abbasi *et al.*, Nucl. Instrum & Meth. **A601**, 294 (2009).
24. Astronomy and Astrophysics with Neutrinos, Francis Halzen and Spencer R. Klein, Physics Today, **61N5** May 2008, pg. 29.
25. The Physics of UltraPeripheral Collisions at the LHC, K. Hencken *et al.*, Physics Reports **458**, 1 (2008).
26. ρ production in ultra-peripheral relativistic heavy ion collisions with STAR, B. I. Abelev *et al.*, Phys. Rev. **C77**, 034910 (2008).
27. First Year Performance of The IceCube Neutrino Telescope, A. Achterberg *et al.*, Astroparticle Physics **26**, 155 (2006).
28. A Cone-finding Algorithm for Heavy-ion Collisions at LHC energies, S.-L. Blyth *et al.*, J. Phys. **G34**, 271 (2007).
29. First Observations of Beam Losses due to Bound-Free Pair Production, R. Bruce *et al.*, Phys. Rev. Lett. **99**, 144801 (2007).
30. e^+e^- Pair Production from 10 GeV to 10 ZeV, Spencer R. Klein, Radiation Physics and Chemistry **75**, 696 (2006).
31. Physics of Ultra-peripheral Nuclear Collisions, C. Bertulani, S. Klein and J. Nystrand, Annual Reviews of Nuclear and Particle Science **55**, 271 (2005).
32. Cherenkov Radiation from e^+e^- pairs and its effect on ν_e Induced Showers, S.K. Mandal, S. R. Klein and J. David Jackson, Physical Review **D72**, 093003 (2005).
33. Photoproduction of Quarkonium in Proton Proton and Nucleus Nucleus Collisions, Spencer Klein and Joakim Nystrand, Physical Review Letters **92**, 142003 (2004).
34. Production of e^+e^- Pairs Accompanied by Nuclear Dissociation in Ultra-Peripheral Heavy Ion Collisions, J. Adams *et al.*, Phys. Rev. **C70**, 031902 (2004). This is work done by my student, Vladimir Morozov, for his dissertation.
35. Multi-photon Exchange Processes in Ultra-Peripheral Relativistic Heavy Ion Collisions, G. Baur *et al.*, Nucl. Phys. **A729**, 787 (2003).
36. Inhomogenous Shadowing Effects on J/ψ Production in dA Collisions, S. R. Klein and R. Vogt, Physical Review Letters **91**, 142301 (2003).
37. Deuteron Photodissociation in Ultra-peripheral Relativistic Heavy Ion-Deuteron Collisions, S. R. Klein and R. Vogt, Physical Review **C68**, 017902 (2003).

38. Nuclear Shadowing and High- p_T Hadron Spectra in Relativistic Heavy Ion Collisions, Phys. Rev. **C67**, 047901 (2003).
39. Does Particle Decay Cause Wave Function Collapse: an Experimental Test, S. R. Klein and J. Nystrand, Phys. Lett. **A308**, 323 (2003).
40. The High-Energy Gamma-Ray Fluence and Energy Spectrum of GRB970417A from Observations with Milagrito, R. Atkins *et al.*, Astrophysical Journal **583**, 824 (2003).
41. A Readout System for the STAR Time Projection Chamber, M. Anderson *et al.*, Nuclear Instruments and Methods **A499**, 679 (2003).
42. The STAR Time Projection Chamber: a Unique Tool for Studying High Multiplicity Events at RHIC, M. Anderson *et al.*, Nuclear Instruments and Methods **A499**, 659 (2003).
43. The STAR Detector Overview, K. H. Ackermann *et al.*, Nuclear Instruments and Methods **A499**, 624 (2003).
44. The Forward Time Projection Chamber in STAR, K. H. Ackerman *et al.*, Nuclear Instruments and Methods **A499**, 713 (2003).
45. Hardware Controls for the STAR Experiment at RHIC, D. Reichold *et al.*, Nuclear Instruments and Methods **A499**, 792 (2003).
46. The STAR Trigger, F. S. Bieser *et al.*, Nuclear Instruments and Methods **A499**, 766 (2003).
47. Coherent ρ^0 Production in Ultrapерipheral Heavy Ion Collisions, C. Adler *et al.*, Physical Review Letters **89**, 272302 (2002).
48. Diffraction at RHIC, A. Bravar *et al.*, J. Phys. **G28**, 2885 (2002).
49. Heavy Quark Photoproduction in Ultra-peripheral Heavy Ion Collisions,, S. Klein, J. Nystrand and R. Vogt, Physical Review C **66**, 044906 (2002).
50. Coherent Vector-Meson Photoproduction with Nuclear Breakup in Relativistic Heavy-Ion Collisions, Anthony. J. Baltz, Spencer R. Klein and Joakim Nystrand, Physical Review Letters **89**, 012301 (2002).
51. A Full Acceptance Detector for the LHC (FELIX), A. Ageev *et al.*, J. Phys. G **28**, R117 (2002).
52. Photoproduction of Top in Peripheral Heavy Ion Collisions, Spencer R. Klein, Joakim Nystrand and Ramona Vogt, European Physics Journal **C21**, 563 (2001).

53. Localized Beampipe Heating due to e^+ Capture and Nuclear Excitation in Heavy Ion Colliders, Spencer R. Klein, Nuclear Instruments and Methods **A459**, 51 (2001).
54. MILAGRITO: a TeV air shower array, R. Atkins *et al.*, Nuclear Instruments and Methods **A449**, 478 (2000).
55. Interference in Exclusive Vector Meson Production in Heavy Ion Collisions, S. Klein and J. Nystrand, Physical Review Letters **84**, 2330 (2000).
56. The Effect of Shadowing on Initial Conditions, Transverse Energy and Hard Probes in Ultrarelativistic Heavy Ion Collisions, V. Emel'yanov *et al.*, Physical Review **C61**, 044904 (2000).
57. Exclusive Vector Meson Production in Relativistic Heavy Ion Collisions, Spencer Klein and Joakim Nystrand, Physical Review C **60**, 014903 (1999).
58. Impact Parameter Dependence of J/ψ and Drell-Yan Production in Heavy Ion Collisions at $\sqrt{s_{NN}} = 17.3$ AGeV, V. Emel'yanov *et al.*, Physical Review **C59**, R1860 (1999).
59. Suppression of Bremsstrahlung and Pair Creation due to Environmental Factors, Spencer Klein, Reviews of Modern Physics **71**, 1501 (1999).
60. Spatial Variation of Nuclear Structure Functions and Heavy Quark Production, V. Emel'yanov *et al.*, Physical Review Letters **81**, 1801 (1998).
61. Charm Quark Production in Non-central Heavy Ion Collisions, V. Emel'yanov *et al.*, Physical Review **C56**, 2726 (1997).
62. Bremsstrahlung Suppression due to the LPM and Dielectric Effects in a Variety of Materials. P. Anthony *et al.*, Physical Review **D56**, 1373 (1997).
63. Results from the STAR TPC System Test, W. Betts *et al.*, IEEE Transactions on Nuclear Science. **44**, 592 (1997).
64. Measurement of Dielectric Suppression of Bremsstrahlung, P. Anthony *et al.*, Physical Review Letters **76**, 3550 (1996).
65. Front End Electronics for the STAR TPC, S. Klein *et al.*, IEEE Transactions on Nuclear Science **43**, 1768 (1996).
66. A Low Noise Amplifier-Shaper with Tail Correction for the STAR Detector, E. Beuville *et al.*, IEEE Transactions on Nuclear Science **43**, 1619 (1996).
67. An Accurate Measurement of the Landau-Pomeranchuk-Migdal Effect, P. Anthony *et al.*, Physical Review Letters **75**, 1949 (1995).

68. A Method of Obtaining Parasitic e^+ or e^- Beams During SLAC Linear Collider Operation. M. Cavalli-Sforza *et al.*, IEEE Transactions on Nuclear Science, **41**, 1364 (1994).
69. A Multiplexed 200 MSPS Waveform Digitizer with Zero Suppression for MACRO. S. Klein and E. Hazen. Nuclear Instruments and Methods **A309**, 536 (1991).
70. Charmed Baryons: A New Laboratory for Charm Studies. S. R. Klein, International Journal of Modern Physics A **5**, 1457 (1990).
71. Upper Limits on D^\pm and B^\pm decays to two leptons plus π^\pm or K^\pm . A.J. Weir, S.R. Klein *et al.*, Physical Review **D41**, 1384 (1990).
72. Λ_c^+ Production and Semileptonic Decay in 29 GeV e^+e^- Annihilation. S.R. Klein, T. Himel *et al.*, Physical Review Letters **62**, 2444 (1989).
73. Charmed and Strange Baryon Production in 29-GeV Electron Positron Annihilation. S.R. Klein, SLAC-Report-330; PhD Dissertation, June, 1988.
74. Observation of Ω^- Production in e^+e^- Annihilation at 29 GeV. S.R. Klein, T. Himel *et al.*, Physical Review Letters **59**, 2412 (1987).
75. Observation of Ξ^- Production in e^+e^- Annihilation at 29 GeV. S.R. Klein, T. Himel *et al.*, Physical Review Letters **58**, 644 (1987).
76. The Rotor Electrometer: A New Instrument For Bulk Matter Quark Search Experiments. John C. Price, Walter R. Innes, Spencer Klein, Martin L. Perl, Review of Scientific Instruments **57**, 2691 (1986).
77. Audiofrequency Measurement of JFET Noise Vs. Temperature in a High Impedance Preamplifier. Spencer Klein, Walter R. Innes, John C. Price, Review of Scientific Instruments **56**, 1941 (1985).
78. The HEAO-A2 Soft X-Ray Survey of Dwarf Novae in Outburst. F.A. Cordova, J.J. Nugent, S.R. Klein, and G.P. Garmire. Monthly Notices of the Royal Astronomical Society **190**, 87 (1980).

Co-authorships

Coauthorship on the following papers, as part of the IceCube, ARIANNA, STAR, Particle Data Group, CYGNUS, MILAGRO, MACRO, TEXAS, Mark II and/or Mark II upgrade collaborations:

79. All-sky search for time-integrated neutrino emission from astrophysical sources with 7 years of IceCube data, M. G. Aartsen *et al.*, arXiv:1609.04981.

80. First search for dark matter annihilations in the Earth with the IceCube Detector, M. G. Aartsen *et al.*, arXiv:1609.01492.
81. Observation and Characterization of a Cosmic Muon Neutrino Flux from the Northern Hemisphere using six years of IceCube data, M. G. Aartsen *et al.*, arXiv:1607.08006.
82. Constraints on ultra-high-energy cosmic ray sources from a search for neutrinos above 10 PeV with IceCube, M. G. Aartsen *et al.*, arXiv:1607.05886.
83. Search for Sources of High Energy Neutrons with Four Years of Data from the IceTop Detector, M. G. Aartsen *et al.*, arXiv:1607.05614.
84. All-flavour Search for Neutrinos from Dark Matter Annihilations in the Milky Way with IceCube/DeepCore, M. G. Aartsen *et al.*, arXiv:1606.00209.
85. Neutrino oscillation studies with IceCube-DeepCore, M. G. Aartsen *et al.*, Nucl. Phys. **B908**, 161 (2016).
86. Searches for Sterile Neutrinos with the IceCube Detector, M. G. Aartsen *et al.*, Phys. Rev. Lett. **117**, 071801 (2016).
87. Lowering IceCube's Energy Threshold for Point Source Searches in the Southern Sky, M. G. Aartsen *et al.*, Astrophys. J. **824**, L28 (2016).
88. Anisotropy in Cosmic-ray Arrival Directions in the Southern Hemisphere Based on six Years of Data From the Icecube Detector, M. G. Aartsen *et al.*, Astrophys. J. **826**, 220 (2016).
89. High-energy Neutrino follow-up search of Gravitational Wave Event GW150914 with ANTARES and IceCube, S. Adrian-Martinez *et al.*, Phys. Rev. **D93**, 122010 (2016).
90. Characteristics of Cherenkov Radiation in Naturally Occuring Ice, R. E. Mikkelsen, T. Poulsen, U. I. Uggerhoj and S. R. Klein, Phys. Rev. **D93**, 053006 (2016).
91. An All-Sky Search for Three Flavors of Neutrinos from Gamma-Ray Bursts with the IceCube Neutrino Observatory M. G. Aartsen *et al.*, Astrophys. J. **824**, 115 (2016).
92. Improved limits on dark matter annihilation in the Sun with the 79-string IceCube detector and implications for supersymmetry, M. G. Aartsen *et al.*, JCAP **1604**, 022 (2016).
93. Search for correlations between the arrival directions of IceCube neutrino events and ultrahigh-energy cosmic rays detected by the Pierre Auger Observatory and the Telescope Array, M. G. Aartsen *et al.*, JCAP **1601**, 037 (2016).

94. First combined search for neutrino point-sources in the Southern Hemisphere with the ANTARES and IceCube neutrino telescopes, S. Adrian-Martinez *et al.*, *Astrophys. J.* **823**, 65 (2016).
95. Searches for Relativistic Magnetic Monopoles in IceCube, M. G. Aartsen *et al.*, *Eur. Phys. J.* **C76**, 133 (2016).
96. Search for Astrophysical Tau Neutrinos in Three Years of IceCube Data, M. G. Aartsen *et al.*, *Phys. Rev.* **D93**, 022001 (2016).
97. The Search for Transient Astrophysical Neutrino Emission With Icecube-Deepcore, M. G. Aartsen *et al.*, *Astrophys. J.* **816**, 75 (2016).
98. Design and Performance of the ARIANNA HRA-3 Neutrino Detector Systems, S. W. Barwick *et al.*, *IEEE Trans. Nucl. Sci.* **62**, 2205 (2015).
99. Evidence for Astrophysical Muon Neutrinos from the Northern Sky with IceCube, M. G. Aartsen *et al.*, *Phys. Rev. Lett.* **115**, 081102 (2015).
100. A combined maximum-likelihood analysis of the high-energy astrophysical neutrino flux measured with IceCube, M. G. Aartsen *et al.*, *Astrophys. J.* **809**, 98 (2015).
101. Beam-Energy Dependence of Charge Balance Functions from Au+Au Collisions at RHIC, L. Adamczyk *et al.*, *Phys. Rev.* **C94**, 024909 (2016).
102. Characterization of the Atmospheric Muon Flux in IceCube, M. G. Aartsen *et al.*, *Astropart. Phys.* **78**, 1 (2016).
103. Detection of a Type II In Supernova in Optical Follow-up Observations of IceCube Neutrino Events, M. G. Aartsen *et al.*, *Astrophys. J.* **811**, 52 (2015).
104. Search for Dark Matter Annihilation in the Galactic Center with IceCube-79, M. G. Aartsen *et al.*, *Eur. Phys. J.* **C75**, 492 (2015).
105. Searches for Time Dependent Neutrino Sources with IceCube Data from 2008 to 2012 M. G. Aartsen *et al.*, *Astrophys. J.* **807**, 46 (2015).
106. Energy dependence of acceptance-corrected dielectron excess mass spectrum at mid-rapidity in Au+Au collisions at $\sqrt{s_{NN}} = 19.6$ and 200 GeV, L. Adamczyk *et al.*, *Phys. Lett.* **B750**, 64 (2015).
107. Effect of event selection on jetlike correlation measurement in d+Au collisions at $\sqrt{s_{NN}} = 200$ GeV, L. Adamczyk *et al.*, *Phys. Lett.* **B743**, 333 (2015).
108. Search for Prompt Neutrino Emission from Gamma-Ray Bursts with IceCube, M. G. Aartsen *et al.*, *Astrophys. J.* **805**, L5 (2015).

109. Radio-frequency Attenuation Length, Basal-Reflectivity, Depth, and Polarization Measurements from Moore's Bay in the Ross Ice-Shelf, S. W. Barwick *et al.* preprint arXiv:1410.7134.
110. Determining neutrino oscillation parameters from atmospheric muon neutrino disappearance with three years of IceCube DeepCore data, M. G. Aartsen *et al.*, Phys. Rev. **D91**, 072004 (2015).
111. Design and Performance of the ARIANNA Hexagonal Radio Array Systems, S. W. Barwick *et al.*, preprint arXiv:1410.7369.
112. A First Search for Cosmogenic Neutrinos with the ARIANNA Hexagonal Radio Array, S. W. Barwick *et al.*, Astropart. Phys. **70**, 12 (2015).
113. Atmospheric and astrophysical neutrinos above 1 TeV interacting in IceCube, M. G. Aartsen *et al.*, Phys. Rev. **D91**, 022001 (2015).
114. Measurement of Interaction between Antiprotons, L. Adamczyk *et al.*, Nature **527**, 345 (2015).
115. Development of a General Analysis and Unfolding Scheme and its Application to Measure the Energy Spectrum of Atmospheric Neutrinos with IceCube, M. G. Aartsen *et al.*, Eur. Phys. J. **C75**, 116 (2015).
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Other Technical Publications

Collective Reviews, White Papers and Conference Summaries

1. PINGU: A Vision for Neutrino and Particle Physics at the South Pole, M. G. Aartsen *et al.*, arXiv:1607.02671.
2. The COHERENT Experiment at the Spallation Neutron Source, D. Akimov *et al.*, arXiv:1509.08702.
3. IceCube-Gen2: A Vision for the Future of Neutrino Astronomy in Antarctica, M. G. Aartsen *et al.*, arXiv:1412.6510.
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5. “Measuring the Neutrino Mass Hierarchy with Atmospheric Neutrinos, D. F. Cowen *et al.*, position paper presented to the APS Div. Nucl. Phys. Town Meeting on Fundamental Symmetries, Neutrinos, Neutrons and related Nuclear Astrophysics Long-Range Plan, Sept. 28-29, 2014. arXiv:1409.5755.
6. “Letter of Intent: The Precision IceCube Next Generation Upgrade (PINGU),” M. G. Aartsen *et al.*, arXiv:1401.2046.
7. Coherent Scattering Investigations at the Spallation Neutron Source: a Snowmass White Paper, D. Akimov *et al.*, arXiv:1310.0125. Written for the 2013 “Snowmass” process.
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21. Review of Particle Properties, S. Eidelman *et al.*(Particle Data Group), *Physics Letters* **B592**, 1 (2004).
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Selected Conference Presentations:

1. “Ultra-Peripheral Collisions with gold ions in STAR,” invited talk presented at Deep Inelastic Scattering 2016, April 11-15, 2016, Hamburg, Germany. The writeup is available as preprint arXiv:1606.02754, and will appear in the proceedings.

2. “Ultra-peripheral Collisions at RHIC: An Experimental Overview,” invited talk presented at the 2nd Intl. Conf. on the Initial Stages in High-Energy Nuclear Collisions, Dec. 3-7, 2014, Napa Valley, Ca. The writeup is available as preprint arXiv:1502.06662.
3. “Photoproduction of charged mesons in ultra-peripheral collisions presented at the Workshop on Photon-induced Collisions at the LHC, June 2-4, 2014, CERN.
4. “Ultra-peripheral ion-ion and electron-ion collisions,” presented at the EIC International Users Group Meeting, June 24-27, 2014, Stony Brook, NY.
5. “High Energy Astrophysics with Neutrinos lecture presented at the TAUP summer school, Sept. 4-8, 2013, Asilomar, CA.
6. “Indirect observations of dark matter presented at Institute for Nuclear and Particle Astrophysics Workshop on Dark Matter, May 8, 2014, LBNL.
7. “Recent Highlights from IceCube,” invited plenary talk presented at the 33rd Intl. Cosmic Ray Conf., July 2-9, 2013, Rio de Janeiro, Brazil. *Braz. J. Phys.* **44**, 540 (2014) and arXiv:1311.6519.
8. “Extra dimensions and the neutrino-nucleon cross-section at high energies,” presented at the Cosmic Frontier Workshop, March 6-8, 2013, SLAC.
9. “Particle Interactions in Matter at the Terascale: the Cosmic-Ray Experience,” invited talk presented at a joint session of the 25th Intl. Conf. on Atomic Collisions in Solids (Oct. 21-25, 2012) and the 8th Intl. Symposium on Swift Heavy Ions in Matter (Oct. 24-27, 2012), Kyoto, Japan. The writeup is arXiv:1212.0274, and will appear in *Nucl. Instrum. & Meth.* **B**.
10. “A radio detector array for cosmic neutrinos on the Ross Ice Shelf,” Spencer R. Klein for the ARIANNA Collaboration,” invited talk presented at the 2012 IEEE Symposium on Radiation Measurements and Applications, May 14-17, 2012, Oakland, CA. The writeup is arXiv:1207.3846, *IEEE Trans. Nucl. Sci.* **60**, 637 (2013).
11. “Dark Matter in a dark place: DM annihilation in IceCube,” Spencer R. Klein for the IceCube Collaboration, invited talk presented at the “Dark Matter in Collision workshop, April 12-13, 2012, UC Davis.
12. “The physics of ultraperipheral collisions,” invited talk presented at the Baltzfest symposium, March 28, 2012, Brookhaven National Laboratory.
13. “Extremely High Energy Cosmic Neutrinos,” invited talk presented at the Whitfest memorial symposium, December 15-16, 2011, UCLA.

14. “Cosmic-Ray Muons & their Energy Loss,” invited talk presented at the Cosmogenic Activities and Backgrounds Workshop, April 13-15, 2011, LBNL.
15. “The nuclear physics of cosmic rays,” invited talk presented at the Fall Meeting of the Division of Nuclear Physics of the American Physical Society, Nov. 2-6, 2010.
16. “Trigger and DAQ challenges for the next generation non-accelerator experiments, invited talk presented at the Workshop on Detector R & D, Oct. 7-9, 2010, Fermilab.
17. Radiodetection of neutrinos, invited plenary talk presented at Neutrino 2010, June 14-19, 2010, Athens, Greece. The writeup is arXiv:1012.1407, Nucl. Phys. B (Proc. Suppl) **229-232**, 284 (2012).
18. “Muon production in relativistic cosmic-ray interactions,” invited talk presented at Quark Matter 2009, March 20-April 4, 2009, Knoxville, TN. Preprint arXiv:0907.4799, and in the proceedings.
19. “Photoproduction at RHIC and the LHC,” invited talk at the 34th Intl. Conf. on High Energy Physics (ICHEP 2008), Philadelphia, PA, July 30-Aug. 5, 2008. Preprint arXiv:0810.3039, and in the proceedings.
20. “IceCube: a Cubic Kilometer Radiation Detector,” invited talk presented at the 2008 Symposium on Radiation Measurements and Applications, June 2-5, 2008, Berkeley, CA. IEEE Trans. Nucl. Sci. **56**, 1141 (2009).
21. “Recent ν s from IceCube,” invited plenary talk presented at Neutrino 2008, May 25-31, 2008, Christchurch, New Zealand. Preprint arXiv:0810.0573 and in the proceedings: J. Phys. Conf. Ser. **136**, 022050 (2008).
22. Study of high p_T muons in air showers with IceCube, poster presented jointly with Dima Chirkin at the 30th Intl. Cosmic Ray Conference, Merida, Yucatan, Mexico, July 3-1, 2007. Published in the proceedings, and in preprint arXiv:0711.0353.
23. “Recent Results from RHIC & Some Lessons for Cosmic-ray Physicists,” invited talk at the 14th Intl. Symp. on Very High Energy Cosmic Ray Interactions (ISVHECRI 2006), Weihai, China, Aug. 15-22, 2006. Preprint nucl-ex/0611040 & Nucl. Phys. B (Proc. Suppl.) **175**, 9 (2008).
24. “Studying High p_T Muons in Cosmic-ray Air Showers,” presented at the 14th Intl. Symp. on Very High Energy Cosmic Ray Interactions (ISVHECRI 2006), Weihai, China, Aug. 15-22, 2006. Preprint astro-ph/0612051 & Nucl. Phys. B (Proc. Suppl.) **175**, 346 (2008).

25. “First Results from IceCube,” invited talk presented at Particles and Nuclei in Collision (PANIC 05), Santa Fe, New Mexico, Oct. 24-28, 2005. Published in the proceedings, and as preprint astro-ph/0601269.
26. “Measuring Structure functions with UPCs at the LHC,” presented at the workshop on Heavy-Ion Physics at the LHC, Oct. 23, 2005, Santa Fe, New Mexico.
27. “Photoproduction at Hadron Colliders,” invited talk presented at the 13th workshop on Deep Inelastic Scattering, Madison, Wisconsin, April 27-May 1, 2005. Published in the proceedings, and as nucl-ex/0506013.
28. “Cascades from ν_e above 10^{20} eV,” presented at “QCD at Cosmic Energies,” Erice, Sicily, Italy, Sept. 29 - Oct. 5, 2004. Published in the proceedings, and as astro-ph/0412158.
29. “Quantum Interferometry in ρ^0 Production in Ultra-Peripheral Heavy Ion Collisions,” poster presented at Quark Matter 2004. Published as nucl-ex/0402007.
30. “Ultra-Peripheral Collisions with STAR at RHIC,” invited talk presented at “Small-x and Diffraction 2003,” Sept. 17-20, 2003, Fermilab, IL Published in the (online) proceedings and as nucl-ex/0310020.
31. “Photoproduction of J/ψ and Υ in pp and $\bar{p}p$ collisions,” presented at Small-x and Diffraction, 2003, Sept. 17-20, 2003, Fermilab, Batavia, Illinois. Co-authored with Joakim Nystrand; published in the (online) proceedings and as hep-ph/0310223.
32. “Vector Meson Interferometry in STAR,” invited talk presented at the workshop on ultra-peripheral collisions, April 21-25, 2003, Inst. of Nuclear Theory, Seattle, Washington.
33. “Ultra-Peripheral Collisions in STAR: Current Results and Future Prospects,” invited talk presented at the Workshop on Coherent Effects at RHIC and LHC: Initial Conditions and Hard Probes, Oct. 14-25, 2002, ECT, Trento, Italy.
34. “Multiple UPCs in a single collision,” invited talk presented at the 2nd Workshop on Ultra-Peripheral Heavy Ion Collisions, Oct. 11-12, 2002, CERN.
35. “Heavy Nuclei, from RHIC to the Cosmos,” invited talk presented at the XIIth Intl. Symp. on Very High Energy Cosmic Ray Interactions, CERN, Geneva, Switzerland, Oct. 15-20, 2002. Published as astro-ph/0211018 and in the proceedings.
36. “Diffractive studies with pp at RHIC,” presented at the Workshop on Diffraction and Glueball Searches at RHIC, May 17-18, 2002, Brookhaven National Lab, NY.

37. “Probing the Nucleus in Ultra-peripheral collisions,” invited talk presented at the Workshop on “QCD in the RHIC era”, April 8-12, 2002, Santa Barbara, CA.
38. “Electrodynamics at the highest energies,” invited talk presented at a workshop on Electromagnetic Probes of Fundamental Physics, Erice, Italy, Oct. 16-21, 2001. Published in the proceedings (also hep-ex/0112018).
39. “Ultra-peripheral collisions at RHIC,” invited talk presented at the 2001 RHIC/AGS users meeting, Aug. 9-10, 2001, Brookhaven, NY.
40. “Ultra-peripheral collisions of relativistic heavy ions,” presented at the Intl. Nucl. Phys. Conf, Jul. 30-Aug. 3, 2001. Published in the proceedings and as nucl-ex/0108018.
41. “A two-source interferometer for short-lived particles in relativistic heavy ion collisions,” presented at the 7th Intl. Conf. on Squeezed States and Uncertainty Relations, June 4-8, 2001, Boston, MA.
42. “Observation of $Au + Au \rightarrow Au + Au + \rho^0$ and $Au + Au \rightarrow Au^* + Au^* + \rho^0$ with STAR”, invited talk presented at the 17th Winter Workshop on Nuclear Dynamics, March 10-17, 2001, Park City, UT. Published in Heavy Ion Physics, **15**, 369 (2002).
43. “Nonlinear QED Effects in Heavy Ion Collisions,” invited talk presented at the 18th Advanced ICFA Beam Dynamics Workshop on Quantum Aspects of Beam Physics, Capri, Italy, Oct. 15-20, 2000. Published in the proceedings and as arXiv:physics/0012021.
44. “RHIC and the Big Bang,” talk presented at the Cosmic Genesis and Fundamental Physics Workshop, October 28-30, 1999, Sonoma State U, Rohnert Park, CA.
45. “Coherent Photonuclear Interactions at RHIC,” invited talk at the RHIC Winter Workshop, Jan 7-9, 1999, Berkeley, CA.
46. “The LPM Effect: Comparing SLAC E-146 Data with Experiment,” invited talk at the Fourth Workshop on Quantum Chromodynamics, June 1-6, 1998, Paris, France. Published in the proceedings (also as hep-ph/9808235).
47. “Bremsstrahlung & Pair Production Suppression and it’s Effect on Air Showers,” invited talk at the Workshop on Observing the Highest Energy Particles ($> 10^{20}$ eV) from Space, Nov. 13-15, 1997, University of Maryland, MD. Published in the proceedings (also as astro-ph/9712198).

48. "The Spatial Dependence of Structure Functions in Heavy Nuclei," presented at the 1997 American Physical Society Division of Nuclear Physics Meeting, October 5-8, 1997, Whistler, BC, Canada.
49. "Coherent Photons and Pomerons in Heavy Ion Collisions," presented at the 6th Conf. on the Intersections of Particle and Nuclear Physics, May 27-June 2, 1997, Big Sky, Montana. The writeup, co-authored with Evan Scannapieco, is in the proceedings.
50. "The Gold Flashlight: Coherent Photons (and Pomerons) at RHIC," presented at Photon '97, May 10-15, Egmond aan Zee, The Netherlands. The writeup, co-authored with Evan Scannapieco, is in the proceedings.
51. "Seeing Pomerons with STAR," presented at the RHIC/INT Winter Workshop on Hadronic Probes of New Physics at RHIC, February 20-22, 1997, Berkeley, CA.
52. "Front End Electronics for the STAR TPC," presented at the 1995 IEEE Nuclear Science Symposium, San Francisco, California, October 23-28, 1995. Published in the proceedings and in IEEE Transactions on Nuclear Science. (listed under publications)
53. "The STAR TPC Front End Electronics," presented at the First Workshop for LHC Electronics", Lisbon, Portugal, September 11-15, 1995. Published in the proceedings.
54. "Two Photon Physics at RHIC," presented at Photon '95, Sheffield, England, April 8-13, 1995. Published in the Proceedings.
55. "A Method of Obtaining Parasitic e^+ or e^- Beams during SLAC Linear Collider Operation," poster presented at the 1993 Nuclear Science Symposium, November, 1993. S. Klein, *et al.*. Published in the conference record and in IEEE Trans. Nucl. Science (listed under Publications).
56. "Measurement of the LPM Effect," invited talk presented at the XVIth International Symposium on Lepton Photon Interactions, Cornell University, August 10th-15th, 1993. Published in the proceedings.
57. "An Experimental Test of the LPM Effect: Bremsstrahlung Suppression at High Energies," presented at the 7th meeting of the Division of Particles and Fields of the APS, November 10-14, 1992, Batavia, IL. Published in the proceedings.
58. "MILAGRO: A Low Threshold Water Cherenkov Air Shower Array," presented at the 7th meeting of the Division of Particles and Fields of the APS, November 10-14, 1992, Batavia, IL. Published in the proceedings.

59. "Competition between Multiple Scattering and Bremsstrahlung," presented at the SLAC Workshop on High Energy Electroproduction and Spin Physics, February 5-8, 1992. Transparencies published in the proceedings, SLAC-Report 392, Feb. 1992.
60. "A Zero Suppressing 200 MSPS Waveform Digitizer for MACRO," presented at the 1991 IEEE Nuclear Science Symposium, Santa Fe, NM, November 5-10, 1991. Published in the Conference Record.
61. "Charmed Baryons (at PEGASYS)," invited talk presented at the Workshop on Electronuclear Physics with the PEGASYS/Mark II Detector at PEP, Stanford, CA, January 9-12, 1991. Transparencies reproduced in the Proceedings.
62. "Recent Results from MACRO" and "Test Beam Requirements for TEXAS," presented at the 1990 DPF Summer Study on Particle Physics, Snowmass, CO, June 25-July 13, 1990.
63. "Triggering and Data Acquisition with the TEXAS Detector," presented at the Workshop on Major SSC Detectors, Tucson, AZ, February 19-23, 1990.
64. "First Results from MACRO," invited talk presented at the 17th Annual SLAC Summer Institute in Particle Physics, July 10-21, 1989. Published in the Proceedings, SLAC-Report-361, January, 1990.
65. "Semileptonic Λ_c Decays with the Mark II at PEP," presented at the XXIIInd Rencontres de Moriond: Current Issues in Hadron Physics, Les Arcs, Savoie, France, March 13-19, 1988. Published in the proceedings.
66. "Detection and Identification of (Long Lived) Neutral Particles," presented at the 3rd Mark II Workshop on Physics at the SLC, Pajaro Dunes, CA, Feb. 14-17, 1987. Published in the proceedings, SLAC-Report 315, July, 1987.
67. "Strange Baryon Production in e^+e^- Collisions at an E_{cm} of 29 GeV," presented at the 1987 Annual Meeting of the Division of Particles and Fields of the APS, Salt Lake City, January 14-17, 1987.
68. "A Course on Modern Physics Through Science Fiction," presented at the joint APS/AAPT Meeting, San Francisco, CA, Jan 27-31, 1987. Abstract published in the Bulletin of the APS **32**, 1402 (1987).
69. "Some Triggering considerations for the Mark II at SLC," presented at the First Mark II Workshop on Physics at the SLC, Asilomar, CA, March 16-19, 1986.

Publications in Conference Proceedings:

I had a significant role in the following publications, but did not give the associated talk:

70. The IceCube Neutrino Observatory, the Pierre Auger Observatory and the Telescope Array: Joint Contribution to the 34th International Cosmic Ray Conference (ICRC 2015), M. G. Aartsen *et al.*, arXiv: 1511.02109. This and the following 5 contributions contain writeups of the roughly 40 contributions to the 2015 ICRC; they also appear in the conference proceedings.
71. IceCube-Gen2 - The Next Generation Neutrino Observatory at the South Pole: Contributions to ICRC 2015, M. G. Aartsen *et al.*, arXiv: 1510.05228.
72. The IceCube Neutrino Observatory - Contributions to ICRC 2015 Part V: Neutrino Oscillations and Supernova Searches, M. G. Aartsen *et al.*, arXiv: 1510.05227.
73. The IceCube Neutrino Observatory - Contributions to ICRC 2015 Part IV: Searches for Dark Matter and Exotic Particles, M. G. Aartsen *et al.*, arXiv: 1510.05226.
74. The IceCube Neutrino Observatory - Contributions to ICRC 2015 Part III: Cosmic Rays, M. G. Aartsen *et al.*, arXiv: 1510.05225.
75. The IceCube Neutrino Observatory - Contributions to ICRC 2015 Part II: Atmospheric and Astrophysical Diffuse Neutrino Searches of All Flavors, M. G. Aartsen *et al.*, arXiv: 1510.05223.
76. The IceCube Neutrino Observatory - Contributions to ICRC 2015 Part I: Point Source Searches, M. G. Aartsen *et al.*, arXiv: 1510.05222.
77. Livetime and sensitivity of the ARIANNA Hexagonal Radio Array, S. W. Barwick *et al.* presented at the 2015 Intl. Cosmic Ray Conf.. Available as preprint arXiv:1509.00115.
78. Performance of the ARIANNA Hexagonal Radio Array, S. W. Barwick *et al.* presented at the 2015 Intl. Cosmic Ray Conf.. Available as preprint arXiv:1509.00109.
79. The IceCube Neutrino Observatory Part I: Point Source Searches, R. Abbasi *et al.* IceCube Contributions to the 2013 Intl. Cosmic Ray Conf., preprint arXiv:1309.6979. This and the following 5 items contain writeups of the roughly 40 IceCube contributions to the 2013 ICRC; they also appear in the conference proceedings.

80. The IceCube Neutrino Observatory Part II: Atmospheric and Diffuse UHE Neutrino Searches of All Flavors, R. Abbasi *et al.* IceCube Contributions to the 2013 Intl. Cosmic Ray Conf., preprint arXiv:1309.7003.
81. The IceCube Neutrino Observatory Part III: Cosmic Rays, R. Abbasi *et al.* IceCube Contributions to the 2013 Intl. Cosmic Ray Conf., preprint arXiv:1309.7006.
82. The IceCube Neutrino Observatory Part IV: Searches for Dark Matter and Exotic Particles, R. Abbasi *et al.* IceCube Contributions to the 2013 Intl. Cosmic Ray Conf., preprint arXiv:1309.7007.
83. The IceCube Neutrino Observatory Part V: Neutrino Oscillations and Supernova Searches, R. Abbasi *et al.* IceCube Contributions to the 2013 Intl. Cosmic Ray Conf., preprint arXiv:1309.7008.
84. The IceCube Neutrino Observatory Part VI: Ice Properties, Reconstruction and Future Developments, R. Abbasi *et al.* IceCube Contributions to the 2013 Intl. Cosmic Ray Conf., preprint arXiv:1309.7010.
85. IceCube - Astrophysics and Astroparticle Physics at the South Pole, R. Abbasi *et al.*, IceCube Contributions to the 2011 Intl. Cosmic Ray Conf., preprint arXiv:1111.5188. This and the following 5 items contain roughly 40 IceCube contributions to the 2011 ICRC; they are also published in the conference proceedings.
86. The IceCube Neutrino Observatory I: Point Source Searches, R. Abbasi *et al.*, IceCube Contributions to the 2011 Intl. Cosmic Ray Conf., preprint arXiv:1111.2741.
87. The IceCube Neutrino Observatory II: All Sky Searches: Atmospheric, Diffuse and EHE, R. Abbasi *et al.*, IceCube Contributions to the 2011 Intl. Cosmic Ray Conf., preprint arXiv:1111.2736.
88. The IceCube Neutrino Observatory III: Cosmic Rays, R. Abbasi *et al.*, IceCube Contributions to the 2011 Intl. Cosmic Ray Conf., preprint arXiv:1111.2735.
89. The IceCube Neutrino Observatory IV: Searches for Dark Matter and Exotic Particles, R. Abbasi *et al.*, IceCube Contributions to the 2011 Intl. Cosmic Ray Conf., preprint arXiv:1111.2738.
90. The IceCube Neutrino Observatory V: Future Developments. R. Abbasi *et al.*, IceCube Contributions to the 2011 Intl. Cosmic Ray Conf., preprint arXiv:1111.2742.
91. The IceCube Neutrino Observatory VI: Neutrino Oscillations, Supernova Searches, Ice Properties. R. Abbasi *et al.*, IceCube Contributions to the 2011 Intl. Cosmic Ray Conf., preprint arXiv:1111.2731.

92. Study of High p_T Muons in IceCube, Lisa Gerhardt and Spencer Klein for the IceCube Collaboration. Presented at the 31st International Cosmic Ray Conference (ICRC 2009), July 7-15, Lodz, Poland. Preprint arXiv:0909.0055, and in the proceedings.
93. The IceCube Collaboration: Contributions to the 30th International Cosmic Ray Conference (ICRC 2007), Merida, Yucatan, Mexico, July 3-11, 2007. Preprint arXiv:0711.0353 (also published in the proceedings) contains 36 individual contributions from IceCube, including two where I am a primary author.
94. The IceCube Collaboration: Contributions to the 29th International Cosmic Ray Conference (ICRC 2005), Pune, India, August, 2005. preprint astro-ph/0509330.
95. Measurement of Ion Beam Losses due to Bound-free Pair Production in RHIC, J. M. Jowett *et al.*, presented at the European Particle Accelerator Conference (EPAC06), Edinburgh, Scotland, June 26-30, 2006, and published in the proceedings.
96. Aspects of Coulomb Dissociation and Interference in Peripheral Nucleus-Nucleus Collisions, J. Nystrand, A. J. Baltz and S. R. Klein, preprint nucl-th/0203062, presented at the Workshop on Electromagnetic Probes of Fundamental Physics, Erice, Italy, Oct. 16-21, 2001, and in the proceedings.
97. The Transverse Energy Spectra at RHIC and Spatial Dependence of Nuclear Structure Functions, V. M. Emel'yanov *et al.*, Feb., 1999, in *Yad. Fiz.* **62**, 2259 (1999) [*Physics of Atomic Nuclei* **62**, 2081 (1999)].
98. Shadowing Effects on Particle and Transverse Energy Production V. Emel'yanov, A. Khodinov, S. R. Klein and R. Vogt, in *Proc. Quark Matter '99*, Nuclear Physics **A661**, 649c (1999).
99. Two-Photon Physics in Nucleus-Nucleus Collisions at RHIC, J. Nystrand and S. Klein, nucl-ex/9811007, November, 1998, in the *Proc. Workshop on Photon Interactions and the Photon Structure*, Lund, Sweden, Sept. 10-13, 1998.
100. Two-Photon Physics at RHIC: Separating Signals from Backgrounds, J. Nystrand and S. Klein, Nov. 1997, in the *Proc. Hadron '97*, August 25-30, 1997, Brookhaven, NY.
101. STAR Controls System, J. Meier *et al.*, in *Proc. ICALEPCS. '95*.
102. A Study of LPM Suppression of Bremsstrahlung, L. Kelley *et al.*, in the *Proc. of the XXIVth Intl. Cosmic Ray Conf.*, Rome, Italy, July, 1995.

103. A Study of LPM Suppression at 25 GeV. R. Becker-Szendy *et al.*, in the Proc. of the XXIIIrd Intl. Cosmic Ray Conf., Calgary, Canada, July 19-30, 1993.
104. Quantum Mechanical Suppression of Bremsstrahlung, R. Becker-Szendy *et al.*, in the Proceedings of the 21st SLAC Summer Institute on Particle Physics, Palo Alto, CA, 1994.
105. Landau-Pomeranchuk-Migdal Effect and Suppression of Beamstrahlung and Bremsstrahlung in Linear Colliders. Pisin Chen and Spencer Klein, in the Proc. of the 3rd Intl. Workshop on Advanced Accelerator Concepts, June 1992, AIP Conf. Proc. **279**, 929 (1992).
106. Report of the Subgroup on the Top Quark. R. M. Barnett *et al.*, in the Proceedings of the 1990 Snowmass Workshop.
107. Λ_c^+ Tagging at a Tau-Charm Factory. Spencer Klein. Published in the Proceedings of the Tau-Charm Factory Workshop, SLAC-Report-343, June, 1989.
108. Data Filtering-Acquisition Group - Report of the Hardware Subgroup, P.S. Cooper, *et al.*, in the Proceedings of the Workshop on Triggering, Data Acquisition and Computing for High Energy/High Luminosity Hadron Colliders, Fermilab, November 11-14, 1985.
109. A Fractional Charge Search. W.R. Innes, S. Klein, Martin L. Perl, John C. Price. SLAC-PUB-2938, June 1982. Presented at the General Meeting of the American Physical Society, Wash. D.C., April 26-29, 1982.

I am a coauthor on the following contributions, as part of the STAR, MACRO, CYGNUS or MILAGRO collaborations:

110. Recent Developments on the Star Detector System at RHIC, H. Wieman *et al.*, the Proceedings of Quark Matter '97, Nucl. Phys. **A638**, 559c (1998).
111. Searching for Gamma-Ray Bursts with Water-Cherenkov-Detector Single-Particle Rates, G.E.Allen *et al.*, Search for Ultra-High Energy Radiation from Gamma-Ray Bursts, G.E.Allen *et al.*, Search for UHE Emission from Supernova Remnants, G. E. Allen *et al.*, A Study of Large Zenith angle Air Showers with the CYGNUS Experiment, G.E.Allen *et al.*, Solar Physics with the MILAGRO Telescope, G. Gisler *et al.*, Source Searches Using the CYGNUS Water Cherenkov Array, G.E.Allen *et al.*, The Milagro Detector, G.E.Allen *et al.*, The Milagro Data Acquisition System, G.E.Allen *et al.*, all in Proc. 1995 Intl. Cosmic Ray Conf., Rome, 1995.
112. Search for Strange Quark Matter using the MACRO Detector, S. Petrerá *et al.*, in Proc. Intl. Workshop on Theoretical and Phenomenological Aspects of Underground Physics, Toledo, Spain, Sept. 9-13, 1991.

113. Multiple Muons and the Primary Cosmic Ray Composition Studied with MACRO, O. Palamara *et al.*, in Proc. Intl. Workshop on Theoretical and Phenomenological Aspects of Underground Physics, Toledo, Spain, Sept. 9-13, 1991.
114. Search for Stellar Collapse by MACRO; Characteristics and Results. R. Bellotti *et al.*, Nuclear Physics B (Proc. Suppl.) **28A**, 61 (1992).
115. Improvements in the CR-39 Polymer for the MACRO Experiment at the Gran Sasso Laboratory. S. Ahlen *et al.*, Nuclear Tracks and Radiation Measurements **19**, 641 (1991).

Other Publications

1. Cosmic neutrinos and more: IceCube's first three years, Francis Halzen and Spencer Klein, to appear in the CERN Courier, December, 2014.
2. The Polar Particle Hunter, IEEE Spectrum, 48N2, 38 (February, 2011).
3. The Worlds Biggest IceCube is ready for Action, Francis Halzen and Spencer Klein, CERN Courier centerfold, **51N2**, 28 (March, 2011).
4. Albert Ghiorso 1915-2010, Spencer Klein, CERN Courier **51N2**, 46 (March, 2011).
5. Hugh Bradner, 1915-2008, CERN Courier, July, 2008.
6. Searching for Physics Down Below, CERN Courier "Inside Story," July, 2007.
7. LBNL Turns 75, CERN Courier pictorial, October, 2006, pg. 31.
8. The Worlds Largest Neutrino Detector Gets Ready for Physics, CERN Courier pictorial, May 2006, pg. 24. Reprinted in the Assn. Asia Pacific Physical Societies Bulletin, October, 2006.
9. Owen Chamberlain: 1920-2006, S. Klein and Lynn Yarris, CERN Courier, May 2006, pg. 34. To be reprinted in the Proceedings of SPIN 2006, Oct. 2-7, Kyoto, Japan.
10. Transuranic Pioneer is 90 Years Young, D. Hoffman and S. Klein, CERN Courier, Sept. 2005, pg. 44.
11. The IceCube at the End of the World, S. Klein and F. Halzen, CERN Courier Cover article, May 2005, pg. 17. Reprinted in the Assn. Asia Pacific Physical Societies Bulletin, June, 2005, pg. 18.
12. Processor Farm Grows at Berkeley, the CERN Courier, Nov. 2004, pg. 19.

13. A New Phase of Matter in Oakland, S. Klein and J. Nystrand, Nuclear Physics News, **14**, No. 3, pg. 37.
14. Quark Matter brings Heavy Ions to Oakland, S. Klein and J. Nystrand, the CERN Courier, April 2004, pg. 25.
15. The Time Projection Chamber Turns 25, S. Klein, the CERN Courier, Jan/Feb. 2004, pg. 40.
16. Germanium Crystals Measure Position, S. Klein, the CERN Courier, October, 2003, pg. 7.
17. Quark Gluon Plasma, Spencer Klein, McGraw-Hill 2000 Yearbook of Science & Technology, and the McGraw-Hill Encyclopedia of Science and Technology.